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Transcutaneous Bilirubinometry in a Rural Teaching Hospital: A Quality Improvement Assessment

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Transcutaneous Bilirubinonmetry in a Rural Teaching Hospital: A Quality Improvement Assessment

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Background

- Up to 84% of term neonates develop jaundice, an early sign of hyperbilirubinemia that warrants evaluation by bilirubin measurement (Muchowski, 2014)
- AAP recommends that every infant receive a systematic evaluation of hyperbilirubinemia risk prior to hospital discharge
- Serum bilirubin testing involves a needle stick, which carries numerous adverse effects including anxiety, pain, altered nociceptive pathways and cost for the family (Lago et al., 2017; AAP Subcommittee on Hyperbilirubinemia, 2004)
- Transcutaneous bilirubin screening (TcB) can measure bilirubin without a needle stick
- TcB has been shown to increase the rate of bilirubin screening while decreasing needle sticks
- TcB may offer reduced costs to families
- TcB is slightly less accurate than needle stick bilirubin at higher concentrations
- TcB may lead to increased phototherapy rates (Kuzniewicz, et al, 2009)

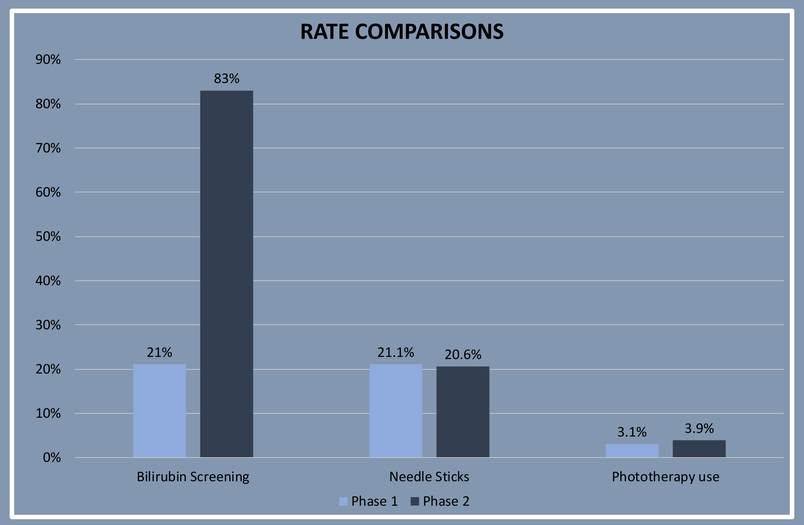
Purpose:

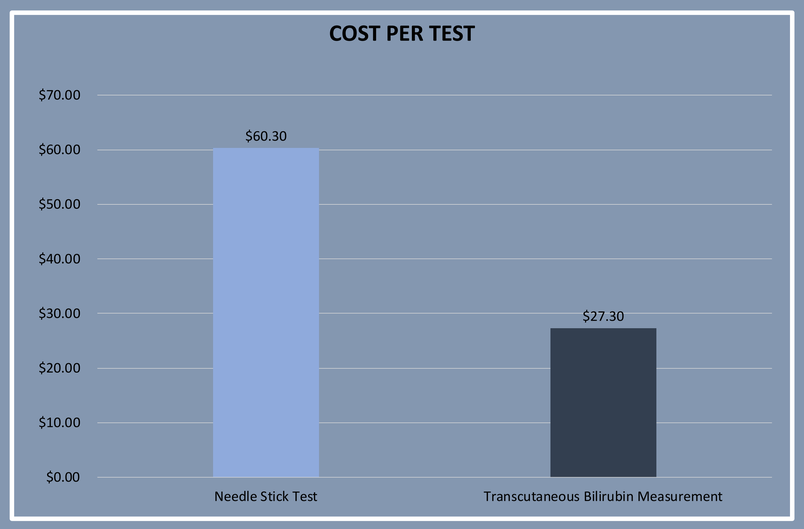
- Determine the effect of transcutaneous bilirubin measurement on needle sticks
- Determine the effect of transcutaneous bilirubin measurement on phototherapy treatment
- Determine the comparative cost-per-test of transcutaneous bilirubin measurement and needle stick bilirubin testing

Methods

- Retrospective data analysis of two three-month phases
- Phase one: Prior to introduction of TcB
- Phase two: Following the introduction of TcB
- Compared data for phase one and phase two regarding the following outcomes:
  - Screening rates
  - Needle stick rates
  - Phototherapy treatment rates
  - Cost per test

Results





- TcB increased the percent of infants screened for hyperbilirubinemia from 21% to 83%. This was a statistically significant difference
- TcB introduction reduced percent of infants receiving needle testing for bilirubin screening from 21% to 20.6%. Though this was not found to be statistically significant, it was clinically significant, as 9 infants were spared needle sticks due to TcB screening
- Phototherapy use increased from 3.1% to 3.9% in the post-intervention period, but this was not a statistically significant difference.
- TcB results in a $27.30 charge to families, while needle stick testing results in a $60.30 charge

Conclusions

The introduction of TcB increased bilirubin screening by 62%, which represents a statistically significant increase in systematic, evidence-based risk assessment for hyperbilirubinemia. Thus, TcB screening increases adherence to AAP recommendations for hyperbilirubinemia screening.

While screening increased, needle stick rates decreased, which is a positive quality of care change for families.

Additionally, there is a cost benefit to families for using TcB instead of needle stick testing. However, it is important to have a consistent procedure for TcB use.

Future Aims

Evidence supports establishing a TcB threshold prior to needle stick testing follow up. The AAP states that TcB values of 15mg/dL do not necessitate needle stick follow up, but this is not a universally adopted standard. Therefore, establishment of a TcB threshold for needle stick testing could further reduce needle sticks and is an important area for further study. This quality improvement assessment highlights the need for formal study to establish an appropriate TcB threshold for needle stick follow up, and the effect of such a threshold on needle sticks.

References

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